SOUTHEAST HIGH SPEED RAIL

Study Area Alternatives

Recommendation Report

Southeast High Speed Rail

Tier I, Draft Environmental Impact Statement

3-21-02

Date of Approval

Secretary Whittington W. Clement

3/18/02

Date of Approval

Secretary Lyndo Tippett, NCDOT

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Executive Summary

The proposed Southeast High Speed Rail (SEHSR) project involves the development, implementation, and operation of high speed passenger rail service in the approximately 500-mile travel corridor from Washington, DC through Richmond, VA and Raleigh, NC to Charlotte, NC.

A 10-year long alternatives development process resulted in the identification of nine alternatives. The impacts to both the human and natural environments were minimized by utilizing the existing rail infrastructure and rail rights-of-way. The initial capital investment required by the system was also minimized by using existing infrastructure. The purpose of the proposed SEHSR project is to reduce travel time for intercity passenger rail service.

In August 1999, the North Carolina Department of Transportation Rail Division (NCDOT) and the Virginia Department of Rail and Public Transportation (VDRPT) initiated a tiered environmental study process of the nine alternatives. In August 2001, the agencies, in cooperation with the Federal Railroad Administration (FRA) and the Federal highway Administration (FHWA), issued a Tier I Draft Environmental Impact Statement (DEIS) on the project. This report summarizes the key findings and comments on the DEIS and identifies the recommended alternative for the Final Environmental Impact Statement (FEIS). The Tier I DEIS is a regional/statewide study, not corridor specific, and as such does not seek agency permits. Following issuance of the FEIS and the Record of Decision (ROD), Tier II studies will commence at the local/corridor level of the recommended alternative and address appropriate environmental and engineering factors.

After a comprehensive analysis of the DEIS and the comments received on it, NCDOT and VDRPT have identified Alternative A (NCRR & S-line), modified with passenger connectivity to Winston-Salem (Alternative B) as the alternative that best meets the project's purpose and need while minimizing environmental impacts (hereafter termed "Alternative A-Plus"). The agencies also recommend that the Alternative A portion be developed first and that the Alternative B portion be developed in conjunction with the efforts of the Piedmont Authority for Regional Transportation (PART), as appropriate. PART is responsible for coordinating the regional transportation system in the counties around the Winston-Salem connection. The reasons for the selection of the Alternative A-Plus include:

- Minimizes potential impacts to wetlands and threatened & endangered species, with moderate levels of potential environmental complexity, and strongest agency support, while providing;
- The highest level of service: highest projected annual ridership, largest combined trip diversions from auto and air to rail, with competitive total travel time;
- Second best net reduction in NO_x emissions and overall net energy use reduction;
- Best operating cost recovery; and
- Highest level of public support.

Figure 1
Recommended Alternative
A-Plus (Alt. A + Alt. B)

Although not a part of the SEHSR corridor recommendation, staff recommends the continued support and facilitation of conventional service along the existing Amtrak route from Raleigh to Richmond (A-line through Rocky Mount, NC), and the protection of the southern route (the ACWR) for potential future development.

Project Description

The proposed Southeast High Speed Rail (SEHSR) project examines corridors connecting Washington, DC to Charlotte, NC, via Richmond, VA and Raleigh, NC for the purpose of implementing higher speed passenger rail service. The corridors consist of existing railroad rights-of-way. Because these are shared corridors, any implementation of higher speed passenger rail service must also facilitate freight movement and other existing uses of the corridors.

The primary motivation for the proposed rail service is captured by the following key statements from the Purpose and Need sections of the DEIS:

- Providing the traveling public – particularly special populations such as the elderly and the disabled – with improved transportation choices;
- Helping ease existing and future congestion (air, highway, passenger rail) within the corridor;
- Improving safety and energy effectiveness within the transportation network;
- Reducing the overall air quality related emissions per passenger mile traveled within the corridor; and
- Improving overall transportation system efficiency within the corridor, with a minimum of environmental impact.

Figure 2 shows the combined study areas for the SEHSR.

Figure 2
SEHSR Study Area

Background and Legislative History

The proposed SEHSR project is part of a plan by the US Department of Transportation (USDOT) and the states to develop a nationwide high speed rail network. Authorization for a program of national high speed rail corridors was included in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA-PL 102-240, Section 1036) and continued in the Transportation Equity Act for the 21st Century (PL 105-178, Section 7201). In 1992, the USDOT designated the SEHSR Corridor as one of five original national high speed rail corridors.[1] Further extensions to the corridor in 1998 added connections into South Carolina, Georgia, and Florida.[2]

Since the initial corridor designation, the Federal Railroad Administration (FRA) and the Federal Highway Administration (FHWA) have worked with North Carolina and Virginia to facilitate development of rail transportation options. In early 1998, FRA, FHWA, NCDOT, and VDRPT entered into a joint Memorandum of Understanding to coordinate and document each agency's respective roles and responsibilities in developing environmental documentation of the rail programs in both states.

The SEHSR program is identified for funding in the FY 2000-2006 NCDOT Transportation Improvement Plan and in the Virginia Department of Transportation (VDOT) FY2000-2005 Six-Year Improvement Program. Both Virginia and North Carolina have conducted specific studies to plan for high speed rail.[3] In addition, both states are undertaking improvements along some routes under study to address existing conventional passenger and freight rail needs in safety and operations.

Project Approach

Based on the findings of earlier feasibility studies[4], NCDOT, VDRPT, FRA, and FHWA, focused on Incremental High Speed Rail (HSR) to formulate and analyze the SEHSR project in the DEIS.[5] This approach minimizes the impacts to both the human and natural environments by utilizing the existing rail infrastructure and rail rights-of-way. By using existing infrastructure, the initial capital investment required by the system is also reduced.

Although the rail facilities already exist in most locations, the Incremental HSR approach would require improvements at various locations within the travel corridor. These improvements would accommodate higher passenger train speeds and increase the capacity of the infrastructure to

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[1] The designated corridor extended from Washington, DC to Charlotte, NC via Richmond, VA and Raleigh, NC. This designation allowed federal monies to be spent on improvements to the existing rail system in order to achieve high speed rail service.

[2] The USDOT designated an extension of the SEHSR from Richmond to Hampton Roads in 1996. In 1998, the USDOT extended the corridor into South Carolina, Georgia, and Florida. Further extensions in 2000 added corridor connections in Georgia and Florida.

[3] Examples of studies conducted include:

The Transit 2001 Commission, North Carolina, appointed in September 1995 (recommendations for improving public transportation in the 21st century; resulted in goal to reduce rail travel times between Raleigh and Charlotte to two hours from 3.75 hours).

Potential Improvements to the Washington – Richmond Corridor, FRA, 1999 (establishment of infrastructure improvements needed to accommodate mix and volume of services projected for 2015).

Washington, DC to Richmond, VA Passenger Rail Study, VDRPT, 1995 (evaluation of future demand, revenues, needed improvements, and cost projections for alleviating congestion and implementing high speed rail).

Preliminary Engineering and Feasibility Study for Additional High Speed Track, Washington, DC to Richmond, VA to the North Carolina State Line, VDRPT, 1992.

[4] Feasibility Study Summary & Implementation Plan, NCDOT – Rail Division, April, 1999.

[5] High Speed Ground Transportation for America, US DOT – Federal Railroad Administration, September 1997.

handle additional passenger and freight rail traffic. This incremental approach for SEHSR would utilize fossil fuel train sets capable of speeds up to 110 mph where safe and practical.[6]

Since the SEHSR could potentially be funded with federal funds and may require federal permits, the Environmental Impact Statement (EIS) process was required, pursuant to the National Environmental Policy Act (NEPA). Because of the magnitude of the study area and the conceptual level of project detail, the NCDOT, VDRPT, and the federal partners chose a Tiered EIS[7] as the appropriate process for environmental documentation.[8]

The SEHSR Tier I Draft EIS provides an overview of the travel corridor and study area alternatives. Approved state transportation plans and programs were the primary context for the transportation analysis. Environmental data was derived from the most current, readily available sources and used to analyze potential environmental impacts within the study area. Based on the findings and recommendations contained in the Tier I document and the Record of Decision, subsequent, more detailed Tier II analysis and documents will be completed as appropriate for the proposed actions.

Agency Coordination and Public Involvement

Together, the NCDOT Rail Division and VDRPT worked with federal agencies, freight railroad companies, state resource and regulatory agencies, and the public to allow for early and on-going input on the SEHSR project.

At the federal level, FHWA and FRA were chosen as the lead federal transportation agencies. Because of an existing Memorandum of Agreement (MOA) in Virginia, the US Coast Guard, the US Army Corps of Engineers, and the US Fish & Wildlife Service agreed to participate as formal cooperating agencies. A Notice of Intent to prepare a Tier I Environmental Impact Statement was published in the Federal Register on August 5, 1999.

The SEHSR team developed a scoping process to gather input from federal and state agencies with areas of responsibility relevant to the project and from the public who are in some way affected by the project. The SEHSR Tier I EIS scoping process was composed of the following:

- Informal communications with agencies about the project – regulatory and resource agencies received informal letters and phone calls in July 1999 to introduce the project concept, prepare for the upcoming tiered EIS process, and provide an early chance to ask questions, seek clarification, and provide input.

[6] High Speed Ground Transportation (HSGT) has been defined by the United States Department of Transportation (USDOT) as ground transportation service that is time competitive with air and automobile travel on a door-to-door basis, in the range of 100 to 500 miles. Source: *High Speed Transportation for America*, USDOT – Federal Railroad Administration, September, 1997.

[7] As described in 23CFR 771.111[g] and CEQ regulations 1502.20 & 1508.28.

[8] When conducting an environmental impact analysis, two types of documents can be developed: a program-level document or a project-level document. A program-level document (Tier 1) is typically performed when a large physical area is being addressed for a proposed project, or when a new program is being introduced that may have far reaching effects. A program-level document typically looks at general environmental conditions and general levels of impact. This is because site-specific details have not yet been identified or designed. A project-level document is performed when a specific project is being looked at in detail. Under this type of analysis, detailed impacts are quantified and analyzed and potential mitigation measures are identified. Sometimes a broad, general document (Tier I) is followed by a number of more detailed documents (Tier II). This is called a tiered approach.

- Formal joint bi-state scoping meeting – a full project overview was presented at the joint bi-state scoping meeting on October 12, 1999. The input from this meeting, provided by oral comments and written comments submitted after the meeting, helped to direct the study efforts of the project team.

- Information briefings and small-group meetings – meetings for regulatory and resource agencies were held in both states to familiarize them with the project and to obtain their input on their key issues. Small group meetings were also held with interested organizations along the corridor in both states.

- Written data and input requests – written requests for data regarding planning efforts within the study area were made of planning directors and school boards. Coordination with State Historic Preservation Officers (SHPOs) was conducted mainly through telephone conversations and meetings.

- The formation of an Advisory Committee – an advisory committee was formed to facilitate sound decisions and to insure input from a broad range of stakeholders in both states (Metropolitan Planning Organizations; Planning District Commissions; local, state, and federal transportation officials; Amtrak; freight railroads; and regulatory and resource agencies). The Committee met in March 2000 to receive a project overview, to ask questions, and to provide input. It reconvened in November 2000 for review and input concerning the Draft *Purpose & Need Statement* and the Draft *Study Area & Modal Alternatives Analysis* Report, and again in late July/early August 2001 to review the DEIS. In December 2001, the Committee met for a review and discussion of the Tier I DEIS key findings and recommendations. The Committee has also reviewed this Recommendation Report.

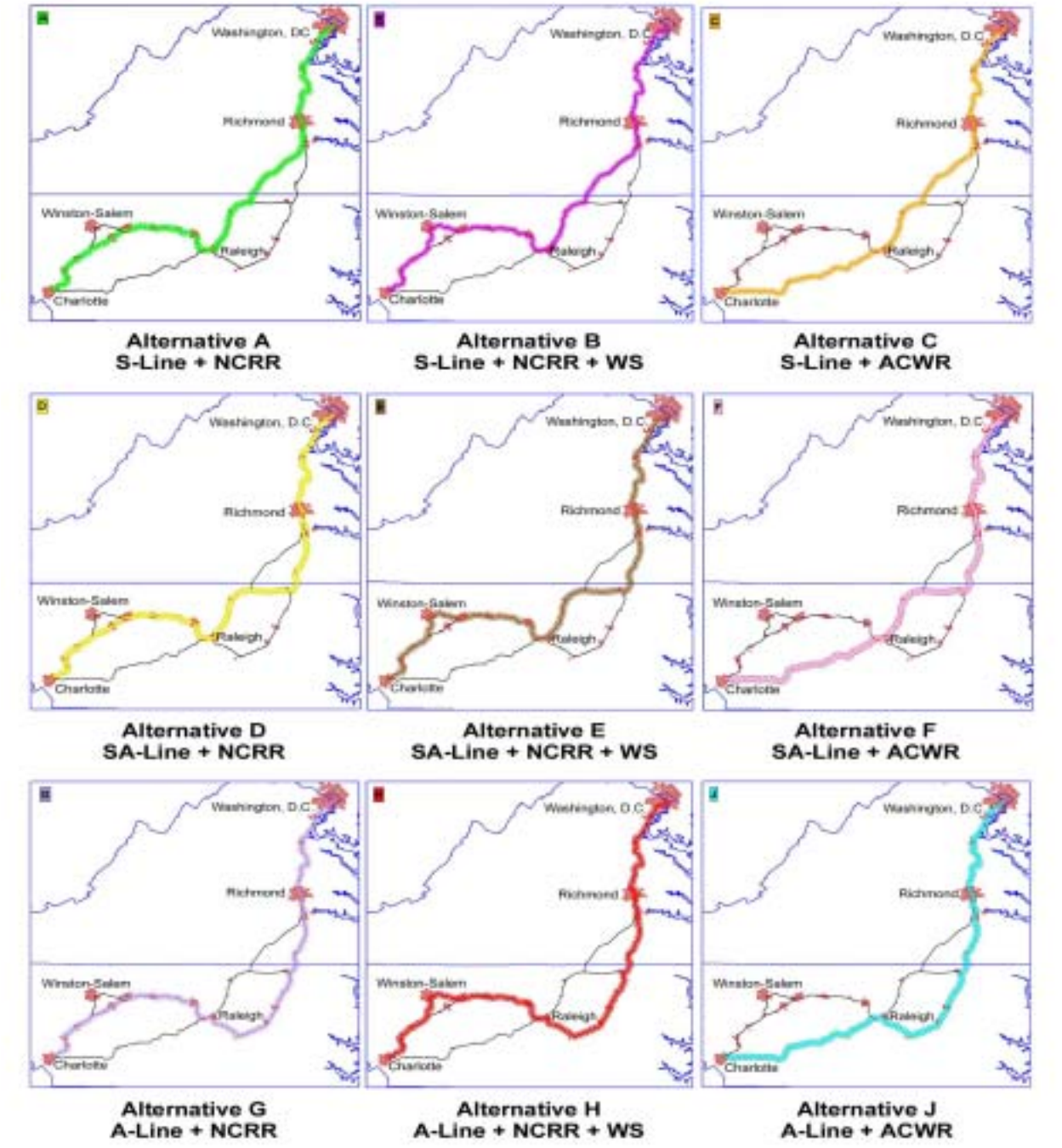
- Public Involvement Program – a proactive public involvement program was conducted to ensure the integration of community feedback through the entire process. The public involvement program will continue to function throughout the life of the project. Pre-DEIS public involvement in the study area included:

    - Almost 7,000 people were contacted, in order to complete a 1,200-sample public opinion survey to determine opinions and concerns about potential high speed rail service and to help shape outreach approaches and techniques.
    - Direct mailings were sent to more than 225,000 addresses along the corridors in both states.
    - Twenty-six public workshops were held to provide a project overview and to view display maps of the entire study area, as well as detailed maps related to specific workshop locations.
    - Community outreach tools, including the SEHSR Web site, project hotline, mobile display units, newsletters, and fact sheets were developed to inform the public about the project.
    - Media outreach was extensive, including media kits, follow-up calls, and editorial board briefings, to increase the visibility of the project.
    - Community outreach research was comprised of environmental justice analysis and community leadership interviews to develop strategies to involve underrepresented groups in decision-making.
    - Public feedback was recorded at workshops, through the project hotline, mail-in comment forms, and in interviews.

Study Area Alternatives

Based on previous feasibility studies, and the interactive scoping process, the states with their federal partners identified nine study area alternatives and a "no build" scenario. The study area alternatives are approximately six miles wide[9] and centered on existing rail rights-of-way as shown in Figure 3 below.

Figure 3
Study Area Alternatives

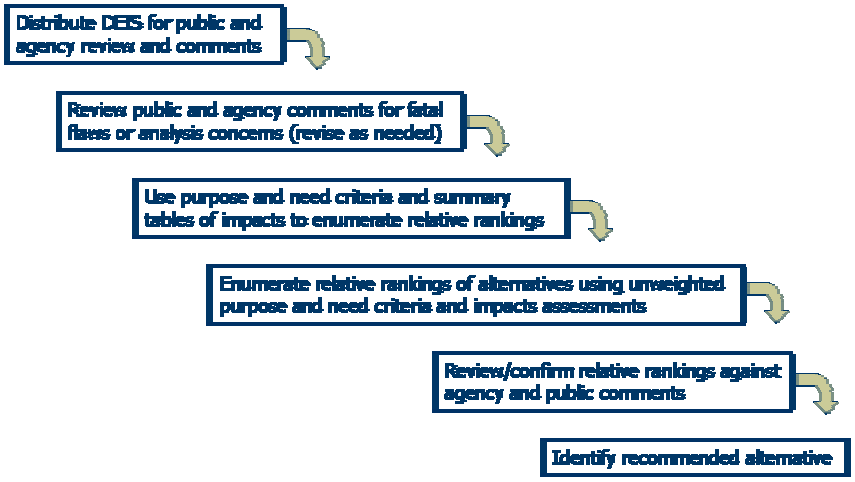


[9] An exception to the 6 mile width is the study corridor north of Richmond VA up to Doswell VA. Here the study area includes both the old C&O line and the old RF&P main line. Only the RF&P was used for analysis.

PROCESS FOR EVALUATING STUDY AREA ALTERNATIVES

To evaluate the study area alternatives and determine a preferred alternative(s) for recommendation in the Final Environmental Impact Statement, the following "waterfall" process was used:

Figure 4
Process for Evaluating Study Area Alternatives



The "waterfall" process was a methodical and sequential means for:

1. Receiving and addressing comments (public, freight railroad, agency, etc.);
2. Correcting for fatal flaws in the analysis or for disqualifying an alternative (as appropriate);
3. Using the purpose and need criteria and the summary table of impacts to enumerate the relative rankings of the nine alternatives;
4. Reviewing the relative rankings of the alternatives against comments received; and
5. Identifying the recommended alternative.

The first step of the evaluation process begins in the next section with a discussion of the extent of public and agency comments.

Public Comments

Up to the release of the DEIS in August 2001, public comments were recorded at workshops, through a hotline, with mail-in comment forms, and in interviews. Between 500 and 600 comments were received. Over 250 of these were substantive feedback, e.g. identification of community concerns. The remaining comments were requests for further project information. The types of issues brought forth through public feedback include:

- Safety, noise, vibration, and impact on property values,
- Mix of commuter and freight rail and increased congestion,
- Access to high speed passenger rail service, and
- Impact on tourism and preservation of historic districts.

In August, 2001, the DEIS was made available to the public and other interested parties for their review and comment at 18 locations. Public hearings on the Tier I DEIS were also held in these cities. The Executive Summary of the DEIS was available on the project web site, and CD's of the full document were made available upon request. The following table shows dates and cities of public hearings and viewing locations for the DEIS document.

Table 1
Public Hearing and DEIS Viewing Locations

Hearing Date	City and Viewing Location	Hearing Date	City and Viewing Location
9/18/01	Durham, NC NCDOT Division 5 Office	10/23/01	Salisbury, NC NCDOT Division 9, District 1 Office
9/20/01	South Hill, VA South Side Planning District Commission	10/25/01	Emporia, VA Emporia City Hall
9/25/01	Sanford, NC Lee County Manager's Office	10/30/01	Winston-Salem, NC NCDOT Division 9 Office
9/27/01	Wilson, NC NCDOT Division 4 Office	11/1/01	Greensboro, NC NCDOT Division 7 Office
10/2/01	Roanoke Rapids NCDOT Division 4, District 1 Office	11/7/01	Richmond, VA VDOT Office, Colonial Heights, & the Richmond Planning District Commission
10/9/01	Henderson, NC NCDOT Division 5, District 3 Office	11/8/01	Petersburg, VA Crater Planning District Commission
10/11/01	Springfield, VA Northern Virginia District Office	11/13/01	Raleigh, NC NCDOT Division 5, District 1 Office
10/16/01	Star, NC Star Municipal Building	11/20/01	Fredericksburg, VA VDOT District Office
10/18/01	Charlotte, NC NCDOT Division 10, District 2 Office	12/10/01	Raleigh/Cary Area, NC NCDOT Division 5, District 1 Office

At each hearing, the public was provided the opportunity to give comments on the Tier I DEIS verbally, in writing, to a certified court recorder, or by mail within 10 days of the public hearing date. A total of 784 comments were received as a result of the Tier I DEIS public hearing process.

Public comments were reviewed and analyzed to determine the public's overall support of or opposition to SEHSR. Six hundred and fifty comments were supportive with only eleven comments opposed. The following table shows the distribution of these comments.

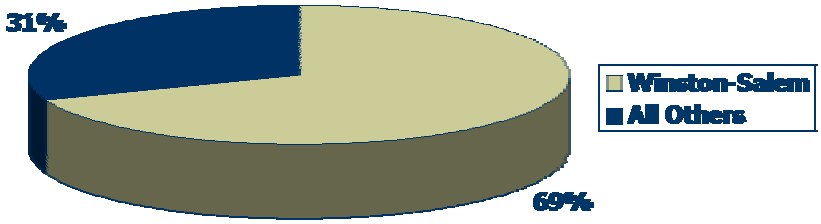
Table 2
Public Comments: Support and Opposition for SEHSR

Location	For	Against	Other	Total
Winston Salem, NC	449	1	6	456
Henderson, NC	36	2	6	44
Roanoke Rapids, NC	24	1	5	30
South Hill, VA	19	0	1	20
Springfield, VA	19	0	26	45
Wilson, NC	19	0	3	22

Location	For	Against	Other	Total
Greensboro, NC	18	0	3	21
Cary, NC	12	0	1	13
Durham, NC	9	1	16	26
Charlotte, NC	9	0	2	11
Raleigh, NC	9	0	6	15
Richmond, VA	8	0	24	32
Salisbury, NC	8	0	2	10
Star, NC	4	6	4	14
Petersburg, VA	3	0	13	16
Fredericksburg	2	0	3	5
Sanford, NC	2	0	2	4
Emporia, VA	0	0	0	0
Totals	***650***	***11***	***123***	***784***

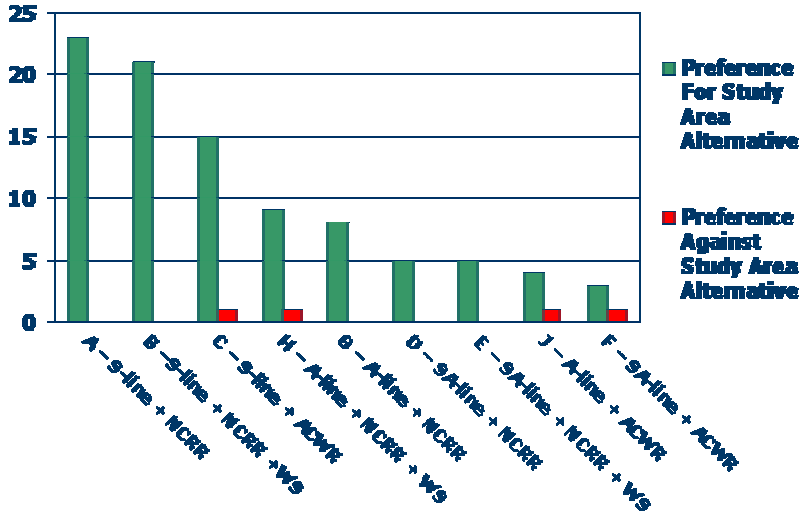
Of the 650 supportive comments, over two thirds supported the alternatives that would pass through the Winston-Salem area (Alternatives B,E,H). Figure 5 further illustrates this support.

Figure 5
Public Comments: Support for SEHSR



39 comments expressed a preference for or against a specific study area alternative; Figure 6 shows the distribution of preferences for or against specific study area alternatives.

Figure 6
Public Comments: Preferences for Study Area Alternatives



The following table shows the distribution of public hearing comments by proximity to the public hearing locations and by the topic of comment.

Table 3
Summary of Tier I DEIS Public Comments By Location and Topic

Comments By Location	Number of Comments		Comments By Topic	Number of Comments
Cary	13		Cost	21
Charlotte	11		Cultural Resource Impact	4
Durham	26		Natural Resource Impact	7
Emporia	0		Noise	5
Fredericksburg	5		Project Schedule	3
Greensboro	21		Property Impact	14
Henderson	44		Public Involvement	8
Petersburg	16		Record Opinion	466
Raleigh	15		Safety	10
Richmond	32		Service Features	119
Roanoke Rapids	30		Stops	90
Salisbury	10		Other	37
Sanford	4			
South Hill	20		***Total***	***784***
Springfield	45			
Star	14			
Wilson	22			
Winston Salem	456			
Total	***784***			

About 83 percent of the general public who provided comments on the DEIS was favorably disposed to the overall proposed SEHSR project. Only one percent of the commenting general public opposed the project.

Agency Comments

Through the advisory committee process, as well as other direct communications, regulatory and resource agencies were engaged to facilitate sound decisions and to ensure input on the SEHSR project. These agencies were involved in the review of each key product as the document process moved forward. As part of the DEIS distribution process, over 50 federal, state, regional, and local agencies received copies of the DEIS for review and comment.

Agencies in both states have been supportive of the tiered environmental process. This process has given the agencies a big picture look at the future work, and allowed their input from the very earliest planning stages. Thirteen agencies provided comments on the SEHSR Tier I DEIS. Other agencies indicated they will wait until more detailed information is available at the Tier II level to review and comment on the proposed project. Table 3 shows the nature of comments provided by regulatory and resource agencies.

Table 4
Summary of Resource and Regulatory Agency Comments

	Preference for Specific Alternative(s) to carry forward	Further Study/ Coordination with Agencies in Tier II	Further Analysis/ Clarification Needed in FEIS	Recommend maximum use of existing ROW	Possible Impacts	No specific comment
U.S. Department of Army, Corps of Engineers, (Virginia)	✓[10]			✓		
U.S. Department of Army, Corps of Engineers, (North Carolina)	✓[11]			✓		
U.S. Department of Agriculture, Natural Resources Conservation Service						✓
U.S. Department of the Interior, Ecological Services – Virginia Field Office						✓
U.S. Department of the Interior, U.S. Fish and Wildlife Service		✓		✓		✓
Environmental Protection Agency, Region III NEPA Compliance Section			✓[12]			
National Oceanic and Atmospheric Administration					✓[13]	
Dept. of Transportation, Federal Hwy. Administration – Virginia Division	✓[14]		✓[15]			
Federal Emergency Management Agency		✓				
Northern Virginia Regional Commission						✓
Virginia Dept. of Historic Resources		✓				
Virginia Dept. of Environmental Quality				✓		
North Carolina Division of Water Quality	✓[16]					

10 The Corps of Engineers (VA) recommends either A,B,C,D,E, or F be carried forward in the FEIS.
11 The Corps of Engineers (NC) recommend Alts. A or B, based on minimizing environmental impacts and maximizing operating efficiency.
12 The EPA suggests providing a summary of each alternative to make clear which alternative appears best from an operational standpoint, which is potentially the most disruptive to communities, or which alternative may be the most impacting to natural resources (note: this data appears in the document in table form, but not in a narrative summary by alternative). In addition, the EPA recommends a more detailed analysis of the following issues in FEIS: (1) noise and vibration; (2) the potential magnitude of disturbances associated with crossings of state and federal Scenic Rivers.
13 The National Oceanic and Atmospheric Administration expressed concern about possible impacts to geodetic control monuments by the proposed SEHSR.
14 FHWA-VA expresses a preference for Alternative C.
15 FHWA-VA asked for additional clarification concerning impact of existing service if Alt. C is developed.
16 The North Carolina Division of Water Quality recommended that Alternatives B, E, or H be carried forward for further study.

Many agencies had positive comments about the extent of coordination during the document preparation and review process. The review by the agencies did not reveal, from their perspective that any regulatory or other environmental "fatal flaws" exist in any of the nine alternatives evaluated.

EPA recommends additional analysis of two topics: potential receptors and the potential impacts of noise and vibration in communities; and an estimation of the potential impacts due to disturbances of state and federal scenic rivers. These issues will be addressed in the FEIS, and in the Tier II effort when more corridor-specific information is available. The comments of FHWA-VA division office on the issues of estimated ridership for Alternative C will be addressed within the FEIS. In depth review of the issues raised by both agencies does not alter the analysis of the recommended alternative.

Assessment Criteria

The assessment criteria for evaluating the study area alternatives were based on the five key factors of the SEHSR project purpose and need. Tables ES-6, *Operational and Physical Characteristics Summary Information for Study Area Alternatives*, and ES-20, *Summary of Potential Impacts and Benefits of the Study Area Alternatives*, from the Executive Summary document of the Tier I DEIS were used as the information sources for the evaluation criteria (see appendix). The following table shows the criteria that were used to assess each purpose and need factor.

Table 5
Evaluation Criteria for Selecting a Recommended Alternative

Key Purpose and Need Factors	Criteria Used in The Assessment
Providing the traveling public – particularly special populations such as a the elderly and the disabled – with improved transportation choices	• Annual Ridership
Helping ease existing and future congestion (air, highway, passenger rail) within the corridor.	• Annual Diversions in 2025
Improving safety and energy effectiveness within the transportation network	• Net energy reduction (fuel gal/yr.) • Number of at grade crossings
Reducing the overall air quality related emissions per passenger mile traveled within the corridor	• Air Quality – Reduction in NO_x
Improving overall transportation system efficiency within the corridor, with a minimum of environmental impacts	• Average Total Travel Time • Net Operating Contribution • Capital Cost Efficiency Factor[17] • Environmental Complexity Index • Engineering and Operations Complexity Index

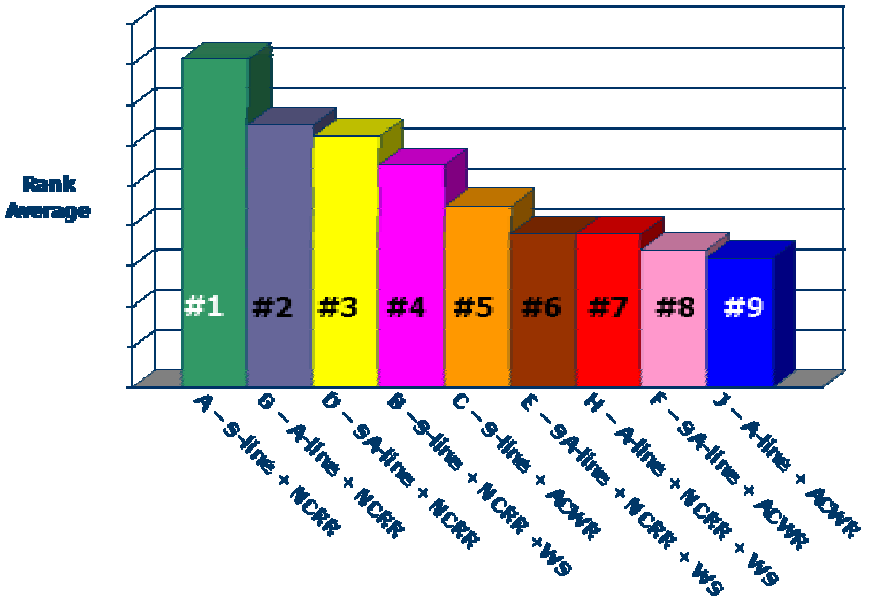
[17] The Capital Cost Efficiency Factor was calculated by dividing the net operating contribution in 2025 by conceptual capital cost and multiplying the result by a factor of 1000.

Of the criteria used in the assessment, six refer to operating/engineering characteristics. Three refer to a composite index or individual environmental factors and one refers to public safety. The emphasis on the operating characteristics is due to the requirement that the recommended alternative be a viable business alternative with a minimum of environmental impacts.

Comparison of the Nine Study Area Alternatives

Each study area alternative was scored on a scale of one to nine (with nine being a higher, or more favorable, ranking) on each of the evaluation criteria shown in Table 5. An unweighted average score was computed for each study area alternative to determine rank averages. The results of this process are shown in Figure 7.

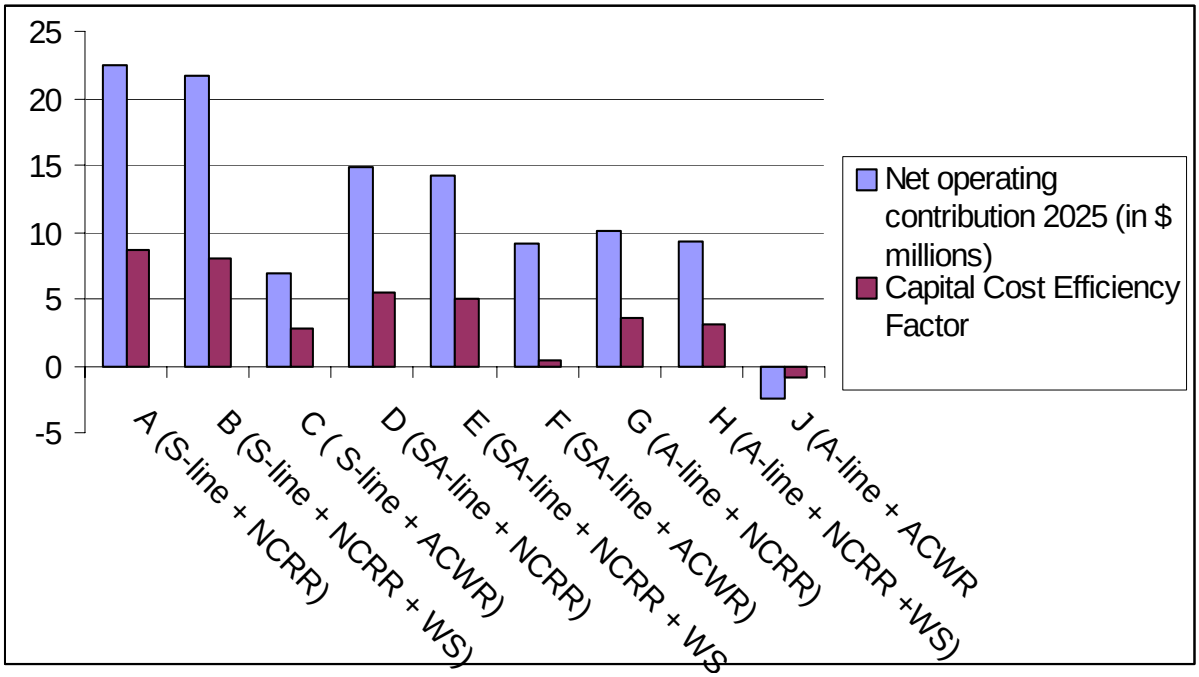
Figure 7
Relative Ranking of Study Area Alternatives



Alternative A ranks highest because it is the best of all nine alternatives for five of the 10 assessment criteria, namely annual ridership, annual air to rail diversions in 2025, net operating contribution, capital cost efficiency, and areas of engineering complexity. Alternative A is second best for four of the 10 criteria, namely annual auto to rail diversions in 2025, net energy reduction, net reduction in NO_x emissions, and average total travel time for the route. From a permitting standpoint, Alternative A is among the lowest for potential wetland impacts and has the lowest potential impacts to threatened & endangered species. Alternative G ranks best in three of the ten criteria, namely annual auto to rail diversions in 2025, net reduction in NO_x emissions, and net energy reduction.

The SEHSR projects's "business case" requires the recommended alternative to be economically viable. In order to determine relative economic viability (between the different study areas), study area alternatives were examined based on the potential net operating contribution[18] and the conceptual capital cost[19]. The net operating contribution did not assume any income from ancillary services such as express mail. The net operating contribution is comparative only, and not intended to predict actual future revenue which will be dependent upon future operating conditions and requirements. The capital cost efficiency factor is the net operating contribution divided by the conceptual capital cost and multiplied by 1000. This gives a form of a benefit/cost ratio for comparison between the different alternatives. Figure 8 shows the comparison of study area alternatives based on these two elements.

Figure 8
Analysis of Study Area Alternatives Based on SEHSR Economic Viability Factors



At this point, Alternatives A, B, D, and G are the most viable candidates for the recommended alternative based on their highest relative ranking using the purpose and need factors (Figure 7).

[18] Ticket revenues were based on ridership derived from the KPMG Ridership/Revenue Model. The model assumed four daily round trips between Charlotte, Raleigh, Richmond, Washington, and New York, and four daily round trips between Charlotte and Raleigh, for a total of eight daily round trips between Charlotte and Raleigh. Each train assumes a consist of two diesel locomotives, five coaches, and one cafe-lounge car. Net Operating Contribution is the revenue generated less the operating expenses for each routing. Operating expenses were projected using cost factors developed in the Amtrak Intercity Business Unit State Pricing Model. The base year for all expenses is 1997, and they have been inflated to 2000 dollars using Amtrak inflation rates ranging from three to five percent annually.

[19] Conceptual costs were based on using current cost factors applied to a conceptual engineering design (approx. 10% engineering level) with a 60% contingency added.

Of the four alternatives, Alternative A and Alternative B show the strongest potential for economic vitality (see Figure 8).

Alternative A and Alternative B also minimize potential wetland impacts. Alternative A offers a moderate level of environmental complexity (6), this is the level of difficulty required to avoid or minimize environmental impacts in a certain area. It ranks second highest in net energy reduction and net reduction in NO_x primarily because it offers service along the most populated areas of the NCRR and it offers the greatest combined passenger diversion from auto and air to rail. Alternative B is similar to alternative A, but has some increased environmental complexity (8) due to grade issues in the Winston Salem area. Alternative D, has the lowest level of environmental complexity (5), but also has the greatest potential impact for prime farmland, protected species, and estimated residential relocations. Alternative G has a moderate level of environmental complexity (7), but has potentially greater impacts to wetlands, which are more prevalent in eastern North Carolina.

Given the complexity of avoiding and/or mitigating for significant wetland acreage, substantial protected species, and prime farmland impacts, Alternatives A and B are the environmentally preferred among those candidates satisfying the purpose and need criteria and economic viability requirements.

Consideration of Public and Agency Comments

From Figure 6, it is clear that Alternative A has the highest level of public support from those individuals expressing a preference among the nine alternatives. From Figure 5, 69 percent of the comments received indicated a desire for passenger service to the Winston–Salem area, which is satisfied through Alternative B. The primary difference between Alternative A and B is the connecting service to the Winston-Salem area. Alternatives A & B also received the most support from those regulatory/resource agencies that expressed support for specific alternatives.

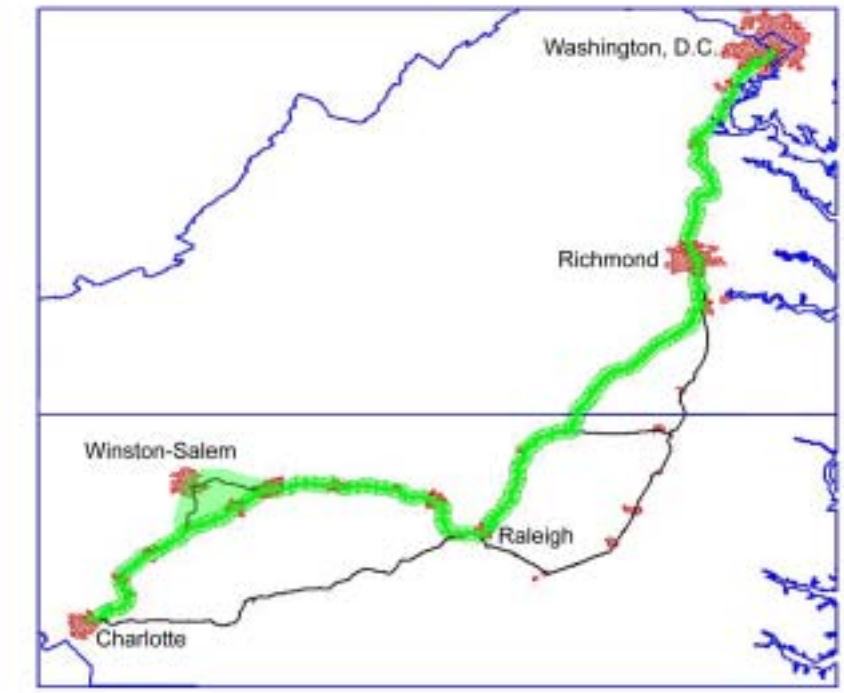
Recommended Study Area Alternative(s)

The general analysis indicates a strong case for Alternative A. In addition, public comment, agency comment, and economic viability suggest strong consideration for Alternative B. Therefore, an Alternative A - plus (Alternative A plus Alternative B, which provides passenger connectivity to Winston-Salem, see Figure 9) is recommended for the FEIS and Tier II analysis. Alternative A would be developed first, with Alternative B developed in conjunction with the efforts of the Piedmont Authority for Regional Transportation (PART) as appropriate. PART is responsible for coordinating the regional transportation system in the counties around the Winston-Salem connection. The primary reasons for the selection of Alternative A-Plus include:

- Minimizes potential impacts to wetlands and threatened & endangered species, with moderate levels of potential environmental complexity, and strongest agency support, while providing;
- The highest level of service: highest projected annual ridership, largest total annual trip diversions from auto and air to rail, with competitive total travel time;
- Second best net reduction in NO_x emissions and overall net energy use reduction;
- Best operating cost recovery; and
- Highest level of public support.

Although not a part of the SEHSR EIS corridor recommendation, staff recommends the continued support and facilitation of conventional service along the existing Amtrak route from Raleigh to Richmond (A-line through Rocky Mount, NC), and the protection of the southern route (the ACWR) for potential future development.

Figure 9
Recommended Alternative: Alternative A-Plus



Geographic Characteristics of Study Areas

Characteristics	A	B	C	D	E	F	G	H	J
Existing Rail Lines	Old RF&P NCRR S-line	Old RF&P S-line NCRR K-line WSSB	Old RF&P S-line NS Line CF Line ACWR	Old RF&P A-line SA-line S-line NCRR	Old RF&P A-line SA-line S-line NCRR K-line WSSB	Old RF&P A-line SA-line S-line NS Line CF Line ACWR	Old RF&P A-line NCRR	Old RF&P A-line NCRR K-line WSSB	Old RF&P A-line NCRR NS Line CF Line ACWR
Segments	1, 2, 3, 5, 6, 13, 14, 15 and 16	1, 2, 3, 5, 6, 13, 14, 16, 17 and 18	1, 2, 3, 5, 6, 13, 19, 20 and 21	1, 6, 7, 8, 9, 11, 13, 14, 15 and 16	1, 6, 7, 8, 9, 11, 13, 14, 16, 17 and 18	1, 6, 7, 8, 9, 11, 13, 19, 20 and 21	1, 7, 8, 9, 10, 12, 13, 14, 15 and 16	1, 7, 8, 9, 10, 12, 13, 14, 16, 17 and 18	1, 7, 8, 9, 10, 12, 13, 19, 20 and 21
Communities Served: **Virginia**	Alexandria Woodbridge Fredericksbur g Ashland Richmond Centralia Petersburg Burgess La Crosse	Alexandria Woodbridge Fredericksburg Ashland Richmond Centralia Petersburg Burgess La Crosse	Alexandria Woodbridge Fredericksburg Ashland Richmond Burgess La Crosse	Alexandria Woodbridge Fredericksburg Ashland Richmond Chester Colonial Heights Petersburg Collier Emporia	Alexandria Woodbridge Fredericksburg Ashland Richmond Chester Colonial Heights Petersburg Collier Emporia	Alexandria Woodbridge Fredericksburg Ashland Richmond Chester Colonial Heights Petersburg Collier Emporia	Alexandria Woodbridge Fredericksburg Ashland Richmond Chester Colonial Heights Petersburg Collier Emporia	Alexandria Woodbridge Fredericksburg Ashland Richmond Chester Colonial Heights Petersburg Collier Emporia	Alexandria Woodbridge Fredericksburg Ashland Richmond Chester Colonial Heights Petersburg Collier Emporia
Communities Served: **North Carolina**	Norlina Henderson Raleigh Cary Durham Burlington Greensboro High Point Lexington Salisbury Charlotte	Norlina Henderson Raleigh Cary Durham Burlington Greensboro Winston-Salem Lexington Salisbury Charlotte	Norlina Henderson Raleigh Apex New Hill Moncure Colon Gulf Robbins Star Troy Norwood Oakboro Aquadale Midland Charlotte	Weldon Norlina Raleigh Cary Durham Hillsborough Burlington Greensboro High Point Lexington Salisbury Concord/ Kannapolis Charlotte	Weldon Norlina Raleigh Cary Durham Hillsborough Burlington Greensboro Kernersville Winston-Salem Lexington Salisbury Charlotte	Weldon Norlina Raleigh Apex New Hill Moncure Colon Gulf Robbins Star Troy Norwood Oakboro Aquadale Midland Charlotte	Weldon Rocky Mount Wilson Selma Clayton Garner Raleigh Cary Durham Hillsborough Burlington Greensboro High Point Lexington Salisbury Concord/ Kannapolis Charlotte	Weldon Rocky Mount Wilson Selma Clayton Garner Raleigh Cary Durham Hillsborough Burlington Greensboro Kernersville Winston-Salem Lexington Salisbury Charlotte	Weldon Rocky Mount Wilson Selma Clayton Garner Raleigh Apex New Hill Moncure Colon Gulf Robbins Star Troy Norwood Oakboro Aquadale Midland Charlotte

Source: Carter & Burgess November 2000: KPMG Model Forecast Data, October 2000. Complied by the Resource Group, Inc, May 2001.

From <u>Southeast High Speed Rail Tier I Draft Environmental Impact Statement</u>, Executive Summary, Page ES-8, August 8, 2001

Operational and Physical Characteristics Summary Information for Study Area Alternatives									
Summary Information	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**
Length (route miles)	448	463	428	468	483	448	481	496	461
Average Total Travel Time (Washington, DC to Charlotte, NC)	6.23 hrs.	6.90 hrs.	6.20 hrs.	6.55 hrs.	7.23 hrs.	6.53 hrs.	6.75 hrs.	7.43 hrs.	6.73 hrs.
Annual Ridership in 2025	1,790,600	1,756,700	1,400,900	1,700,700	1,660,600	1,333,300	1,669,700	1,625,000	1,312,000
Net operating contribution or (loss) in year 2025	$22,497,500	$21,649,000	$6,913,500	$14,788,500	$14,237,000	$908,500	$10,150,000	$9,340,500	$(2,443,000)
Conceptual Capital Cost* (In Billions of dollars)	$2.611	$2.720	$2.515	$2.711	$2.820	$2.615	$2.848	$2.957	$2.752
Areas of Engineering Complexity (high)**	18	23	25	20	25	27	19	24	26
Potential right of way needs (in acres)	678	731	930	620	674	872	545	598	797
Estimated Relocations									
-Residential dwellings (each)	365	371	220	405	411	260	301	307	156
-Business (square footage)	65,145	110,920	57,374	62,191	107,966	54,420	70,344	116,119	62,573
Annual 2025 Trip Diversions									
-From auto to rail	865,349	841,840	595,092	858,004	828,290	585,761	899,266	863,596	613,822
-From air to rail	320,061	311,365	220,103	242,001	233,620	165,215	171,289	164,494	116,918
Fuel consumption (gal./trip)	403	432.3	383.5	421.2	450.5	401.7	434.2	463.5	414.7
At grade crossings	1,053	1,172	918	1,134	1,254	1,100	1,115	1,235	963

*All monies are in year 2000 dollars. Costs do not include equipment or station improvements.

** The complexity of the engineering required to design or construct the proposed project was based upon conceptual engineering assuming use of the existing railroad rights of way. An area was considered high if it involved considerable realignments or if physical constraints offered major challenges to developing acceptable engineering solutions.

Source: Carter & Burgess, Inc.; KPMG *Ridership and Revenue Report* September 2000: and William Gallagher and Associates.

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Note: This chart is corrected to show Net Operating Contribution from only the 8 modeled SEHSR trains

Environmental Information	Buffer width for review	A	B	C	D	E	F	G	H	J
Water Supply Watersheds	6 mi.	27	33	19	28	35	21	27	34	21
Major Rivers (potential crossings)	n/a	29	28	29	31	30	33	29	28	31
Wetlands (NWI & hydric soils)	300 ft.	117.3	115.8	117.0	124.0	122.5	123.7	190.7	189.2	190.4
FEMA 100-year Floodplain crossings	n/a	83	76	44	89	82	50	97	90	58
Mineral Resources (Mines)	.5 mi	36	37	40	37	38	41	33	34	37
Hazardous Materials Sites	6 mi.	1,708	1,728	1,426	1,720	1,740	1,448	1,176	1,780	1,488
Air Quality-Net reduction in NOx emissions (lbs/yr)	n/a	554,889	530,895	279, 065	547,392	517,065	269,540	589,505	553,099	298,179
Annual 2025 Trip Diversions	n/a									
-From auto to rail		865,349	841,840	595,092	858,004	828,290	585,761	899,266	863,596	613,822
-From air to rail		320,061	311,365	220,103	242,001	233,620	165,215	171,289	164,494	116,918
Noise &Vibration Category 3 sensitive receptors	300 ft.	333	342	259	371	371	287	369	372	284
Prime farmland (acres)	6 mi.	37,219	39,360	26,523	45,137	46,992	34,308	57,346	59,134	46,670
Protected Species- # Of known populations identified	6 mi.	33	35	45	44	46	56	43	49	51
National Rivers Inventory	6 mi.	11	11	13	10	11	13	12	13	14
Estimated Relocations										
-Residential dwellings (each)	n/a	365	371	220	405	411	260	301	307	156
-Business (square footage)	n/a	65,145	110,920	57,374	62,191	107,966	54,420	70,344	116,119	62,573
Historic Sites										
-National Register Sites	1500 ft.	61	61	32	32	61	32	48	48	19
-Study List Sites	1500 ft.	317	317	273	387	387	343	390	390	346
Parks	500 ft.	14	15	11	14	15	11	15	16	12
Gamelands/Public lands (ac.)	500 ft.	5.7	5.7	14	5.7	15.7	15.3	5.7	5.7	15.3
Areas of Environmental. Complexity (high)*	n/a	6	8	4	5	7	3	7	9	5

Refers to the level of difficulty required to avoid or minimize environmental impacts in a certain area. High areas of complexity are those that would require creative avoidance and minimization techniques and add to the overall construction effort and would require public and agency coordination and involvement.
Source: Carter & Burgess, Inc. 2001, compiled the Resource Group May 2001

From Southeast High Speed Rail Tier I Draft Environmental Impact Statement, Executive Summary, Page ES-10, August 8, 2001